



GIS Support for Barrier Island Parameters: Coastal Breaching Index

ERDC Dredging Operations Technical Support Program (DOTS)

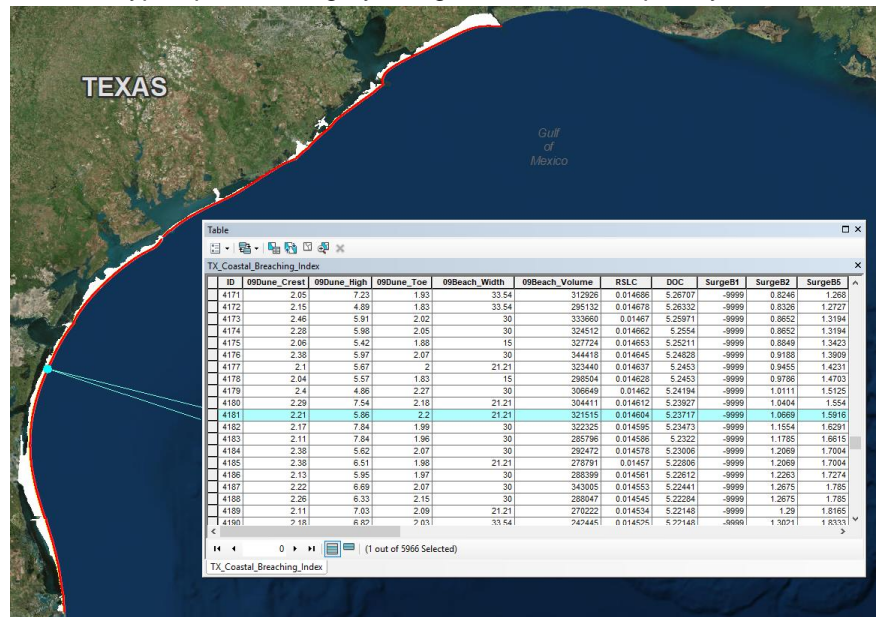
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Response Summary:

ERDC researchers provided GIS expertise to integrate available datasets into a useful index for calibrating and validating a conceptual model to determine the overall resiliency and vulnerability of the Texas barrier island system. This coastal breaching index consists of select barrier island parameters that were derived from available physical data, hydrodynamic models, and geospatial datasets, such as geomorphic parameters (i.e., dune crest, dune toe, beach width, volume change, etc.) and environmental parameters (i.e., dune vegetation and impervious surface) derived from the 2016 and 2009 National Coastal Mapping Program Lidar data and hyperspectral imagery using methods developed by the Joint Airborne Lidar Bathymetry Technical Center of Expertise. The coastal breaching index parameters include the following:

- Dune Crest Elevation
- Highest Dune Crest Elevation
- Dune Toe Elevation
- Beach Width
- Barrier Volume
- Dune Vegetation Fractional Coverage
- Impervious Area Fractional Coverage
- Relative Sea Level Change Rate
- Depth of Closure Distance
- Gulf-side Water Surface Elevations
- Bay-side Water Surface Elevations
- Shoreline Erosion Rate (near-term)
- Shoreline Erosion Rate (long-term)



Period of Performance:

This project began on 1 July 2018 and concluded on 30 September 2018.

Benefits of the Response to the USACE Dredging/Navigation Program:

Having a unified dataset will allow for the calibration and validation of coastal breaching conceptual models. These models will be utilized to identify priority areas for beach nourishment through the USACE O&M beneficial use of dredged material (BUDM) mission. Furthermore, promoting resiliency along the barrier islands, the first line of defense, additionally supports regional resiliency and provides a buffer to USACE projects, including navigation channels.

Deliverable:

The products delivered as part of this effort include detailed methodology and a compilation of parameters from available datasets into a single geodatabase. The final geodatabase includes: (a) coastwide LiDAR-derived parameters (averaged where applicable), (b) depth of closure, (c) active profile slope, (d) shoreline erosion rates, (e) relative sea-level change rates, and (f) surge modeling elevations.



Providing environmental and engineering technical support to the U.S. Army Corps of Engineers Operations and Maintenance navigation and dredging missions

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